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based upon the best sources and made with great care. The chapter adds much to the value of this volume as a book of reference.

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The Development of the Periodic Law. By F. P. VENABLE, Ph. D., Professor in the University of North Carolina. Easton, Pa., Chemical Publishing Company. 1896. Pp. viii+321. Price, \$2.50.

The purpose of this book cannot be better given than in the author's own words: "This work * * * is to be used for purposes of reference and of study, and not as a mere history of the subject. The errors and repetitions of the writers upon this subject in the past few years have abundantly proved the necessity for some such gathering and systematizing the work of former years."

Professor Venable's work in writing his recently published History of Chemistry has given him an excellent preparation for the critical study of the discovery and development of the periodic law, which is given in this volume. As stated by the author, much of the literature of the subject is in hidden and out-of-the-way places and a very real service is rendered to chemical science in thus coordinating it and making it more easily accessible. The scope of the book includes an account of the numerous attempts which have been made to discover numerical and other relations between the atomic weights and also an account of speculations as to the origin of the elements and their relation to some fundamental form of matter.

Calculations and speculations of this kind have had a fatal fascination for a great many chemists, and as we look over the literature and see how much has been written that is fanciful, and how much that in the light of better knowledge has been found erroneous and worthless, we are almost tempted to turn from the whole subject in disgust. And there is no doubt that many of these speculations have been worthless and the time of their authors has been nearly or quite wasted, for they have led to no accepted conclusions and they have given no incentive to useful work. But the periodic system stands on quite a different plane, for it

furnishes us the best means at present available for coordinating our knowledge of the chemical elements, and it has furnished the incentive for a large amount of most excellent experimental work. That there are some imperfections in the system and that it does not, at present, give any accurate mathematical expression for our chemical knowledge must be admitted. It is tantalizing in its suggestiveness, and most chemists believe that it half reveals facts which will be of profound importance when fully understood. If the present work turns the attention of chemists in that direction it may prove very useful.

A quite full bibliography and an excellent index add to the usefulness of the work.

W. A. N.

Notes on Qualitative Analysis, arranged for the use of students of the Rensselaer Polytechnic Institute. By W. P. MASON, Professor of Chemistry. Third Edition. Easton, Pa., Chemical Publishing Company. 1896. Pp. 56. Price, 80 cents.

This book gives a concise statement of the more important qualitative tests for metals and acids, those for the metals being arranged in the order of Fresenius. Then follow tables for analysis of metals, and five pages giving very short directions for the analysis of alloys, insoluble substances and alkaline solutions.

The selection of tests is satisfactory and the book will, doubtless, furnish a basis for a good short course in the subject. It would seem, however, that even an elementary work should give directions which are reliable for cases of very common occurrence. For instance, ammonia often fails to separate small quantities of silver chloride from mercurous chloride; and ammonia will not separate zinc from chromium unless the zinc is in excess. Neither case is provided for in the directions given.

Books of this character may furnish students with excellent drill in scientific methods of work and, in the hands of a good teacher, are satisfactory from that standpoint, but the student should understand that he is liable to fall into very serious mistakes if he attempts to use the directions for practical work.

The references to Watts' dictionary and the

chemical journals form an excellent feature of the book. The habit of going to proper sources for fuller information cannot be formed too early and is of fundamental importance to any one hoping to do scientific work.

W. A. N.

A Manual of Quantitative Chemical Analysis, for the use of Students. By FREDERICK A. CAIRNS, A. M., Late Instructor in Analytical Chemistry in School of Mines, Columbia College. Third edition. Revised and Enlarged by ELWYN WALLER, Ph.D., formerly Professor of Analytical Chemistry in School of Mines, Columbia College. New York, Henry Holt & Co. 1896. Pp. xii+417.

This work was first published in 1880. In the thorough revision, which has become necessary, a considerable portion has been rewritten and additional chapters have been inserted, while the portion upon organic proximate analysis has been omitted.

The book is evidently intended for use in training those who intend to use their knowledge of analytical chemistry along commercial lines. After an introduction of twenty-two pages, ten chapters are given which contain directions for the complete analysis of a series of pure salts, including directions for the determination of seventeen elements. Then follows the main portion of the book, with chapters giving detailed directions for the analysis of limestones, clay, ores, metals and alloys as found in commerce, potable and mineral waters, acids and alkalies, bleaching powder, fertilizers, coal and commercial nitrates.

The selection of topics is such as to meet very satisfactorily the need of the practical chemist, and the directions given are clear and sufficiently full for beginners. The appendix, by Professor Waller, giving the properties of precipitates is an especially valuable feature of the book.

It would be impossible for any one to write a book covering such an multitude of details as are required in quantitative analysis and give directions which accord, in every case, with the best knowledge of the subject. Two cases which may be criticized on this ground are worthy of notice because of their importance.

Gladding has shown (J. Am. Ch. Soc., 17, 398) that barium chloride should be added very slowly to secure a pure precipitate of barium sulphate, and Jannasch and Richards (J. Prak. Ch., 39, 321) and Schneider (Z. f. Phys. Ch., 10, 425) have shown that the barium sulphate precipitated in presence of ferric salts contains ferric sulphate, which loses sulphuric acid on ignition and renders a subsequent purification by fusion inaccurate. The other case is that of the Lindo-Gladding method for the determination of potassium. It has been shown that the method is inaccurate because the potassium of the chloro-platinate is partly replaced by ammonium on washing with ammoniums chloride.

Since Ostwald has pointed out so clearly the value of the new theories of physical chemistry for the practical discussion of many topics in analytical chemistry, it is to be hoped that some discussion of that sort may soon find its way into our text-books. The present book is neither better nor worse than others in that regard.

W. A. N.

SCIENTIFIC JOURNALS.

THE AUK, JANUARY, 1897.

THE number contains articles of varied interest. Mr. E. W. Nelson describes some forty new species and subspecies and one new genus of birds from Mexico and Guatemala, collected by himself and Mr. E. A. Goldman during explorations conducted for the Biological Survey of the United States Department of Agriculture during the last five years. These collections include between four and five thousand specimens, many of them collected in districts never before visited by an ornithologist. Dr. A. P. Chadbourne concludes his paper, begun in the October number, on 'Evidence suggestive of the Occurrence of Individual Dichromatism in *Megascops asio*.' This paper is illustrated with a colored plate. Two captive individuals of this species, fed on an exclusive diet of liver, were observed to change from the gray to the red phase without any evidence of molting. Other technical papers treat of various questions of nomenclature and include descriptions of a new subspecies each of the Yellow and Black-throated Blue Warblers.